vol. IV no. 8

April, 1945

School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

California Polytechnic College
by Julian McPhee

Three Shop Aids
by G. H. Billingham

A Useful Lathe Dog
by Aubrey C. Dayman

Teaching Distribution
By R. Randolph Karch

On the cover: A student at California Polytech using the magnaflux machine to test an aircraft part. See page 7 for a description of the Polytech program.

Better Shopmen Know About Pittsburgh's

Color Dynamics

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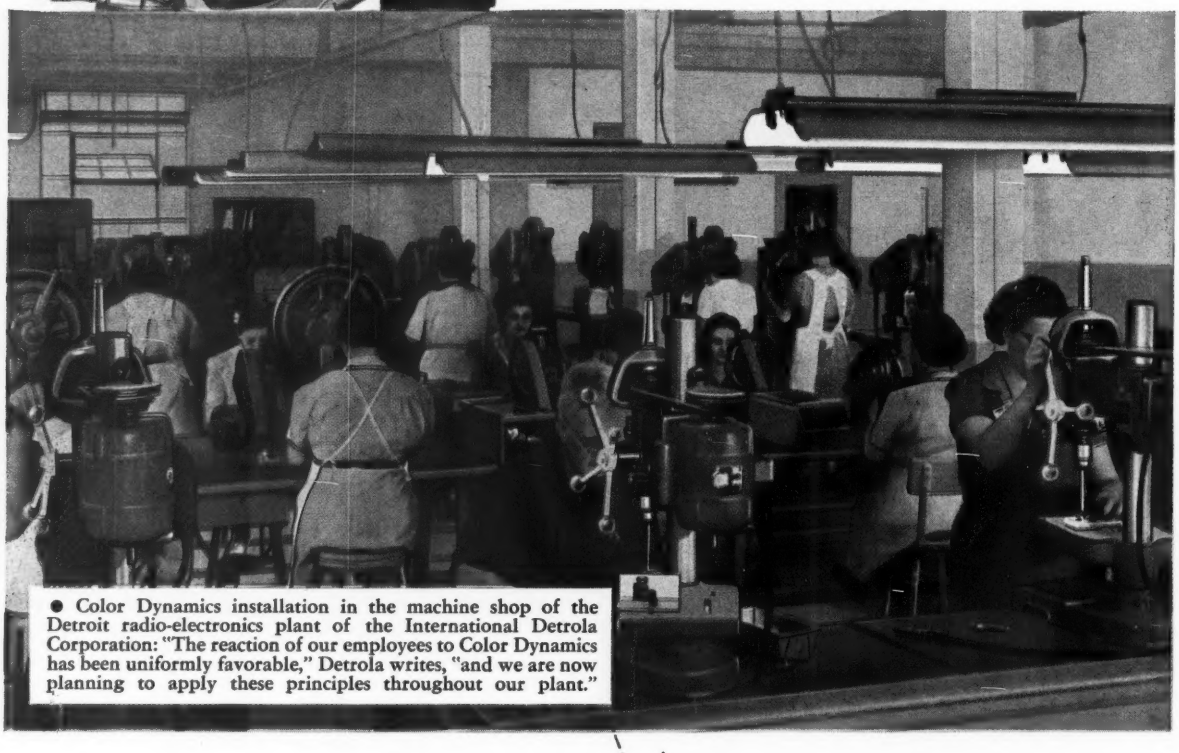

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The next two months will find much of interest to teachers in the columns of SCHOOL SHOP. Two topics of major interest to be covered are electronics in high schools and the use of visual materials. The June number will carry the directories of suppliers and of professional groups and personnel throughout the country which has proved so helpful in past years. Projects and the regular monthly features will continue to provide practical instructional help and broad information on developments in the industrial-education field.

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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

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School Shop is published monthly, September through June, at Ann Arbor, Michigan. Manuscripts are paid for at regular space rates and should be addressed to the Editor, School Shop, 330 South State Street, Ann Arbor, Michigan. Subscription rates to libraries and institutions, $2.00 a year; Foreign and Canadian, $3.00 a year. 25 cents a copy. Printed in the U.S.A.

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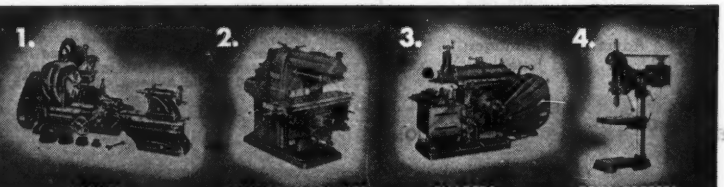

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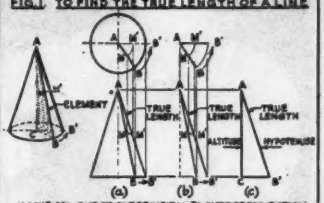
PROBLEMS IN TRIANGULATION

BASIC PRINCIPLES

Drawn by Michael S. Diamond.

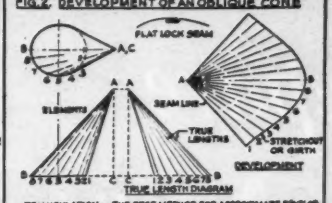
FIG. 1. TO FIND THE TRUE LENGTH OF A LINE



A LINE OBLIQUE TO THE PRINCIPAL PLANES OF PROJECTION WILL NOT SHOW IN ITS TRUE LENGTH IN ANY OF ITS PRINCIPAL VIEWS. IF THE LINE IS REVOLVED INTO A POSITION PARALLEL TO ONE OF THE PLANES OF PROJECTION, ITS TRUE LENGTH WILL BE SHOWN IN THAT VIEW. THIS IS ILLUSTRATED IN FIG. 1, (a) AND (b). BY ASSUMING THE LINE TO BE AN ELEMENT OF A CONE.

THE TRUE LENGTH OF A LINE MAY ALSO BE FOUND BY CONSTRUCTING A RIGHT TRIANGLE WHOSE BASE IS EQUAL TO THE TOP VIEW OF THE LINE, AND WHOSE ALTITUDE IS THE DIFFERENCE IN ELEVATION OF THE ENDS. THE HYPOTENUSE OF THE TRIANGLE IS EQUAL TO THE TRUE LENGTH OF THE LINE AS IN (c). THIS PRINCIPLE IS APPLIED IN SOLVING THE DEVELOPMENTS OF THE SUBSEQUENT CONE AND TRANSITION PIECES.

FIG. 2. DEVELOPMENT OF AN OBLIQUE CONE

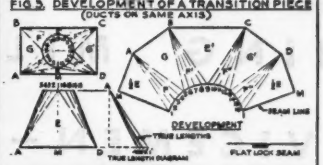


TRIANGULATION.—THE BEST METHOD FOR APPROXIMATE DEVELOPMENT OF NONDEVELOPABLE SURFACES IS TO ASSUME THAT THE SURFACE IS MADE UP OF A LARGE NUMBER OF TRIANGULAR STRIPS OR PLANE TRIANGLES WITH VERY SHORT BASES. THIS METHOD OF DEVELOPMENT IS CALLED TRIANGULATION AND IS USED FOR ALL WARPED SURFACES AND OBLIQUE CONES.

ELEMENTS A5, A7, ETC., ARE ALL OF DIFFERENT LENGTHS AND ARE NOT SHOWN IN THEIR TRUE LENGTHS IN EITHER THE TOP VIEW OR FRONT VIEW. IN ORDER TO FIND THEIR TRUE LENGTHS IT IS NECESSARY TO CONSTRUCT RIGHT TRIANGLES BY THE METHOD SHOW IN FIG. 1 (c). THESE TRIANGLES MAY BE COMBINED INTO A TRUE LENGTH DIAGRAM AS SHOWN. THE DEVELOPMENT IS THEN MADE BY CONSTRUCTING THE TRIANGLES ONE AT A TIME AND JOINING THEM ON THEIR COMMON SIDES.

PRACTICAL APPLICATIONS

FIG. 3. DEVELOPMENT OF A TRANSITION PIECE (DUCTS ON SAME AXIS)



TRANSITION PIECES ARE SURFACES OR CONNECTORS USED TO JOIN TWO DUCTS OR PIPES DIFFERING IN SHAPE, SIZE, LOCATION, OR A COMBINATION OF THESE.

THE TRANSITION PIECE SHOWN IN FIG. 3 IS COMPOSED OF FOUR ISOSCELES TRIANGLES AND FOUR CONICAL SURFACES. BEGIN THE DEVELOPMENT ON THE LINE 1-9, AND DRAW THE RIGHT TRIANGLE 1-M4, WHOSE BASE M4 IS EQUAL TO HALF THE SIDE A5 AND WHOSE HYPOTENUSE A-1 IS EQUAL TO A-1'. THE TRUE LENGTH OF THE SIDE A-1. THE CONICAL SURFACES ARE DEVELOPED BY TRIANGULATION AS EXPLAINED IN FIG. 2.

FIG. 4. DEVELOPMENT OF A TRANSITION PIECE (DUCTS ON PARALLEL AXES)

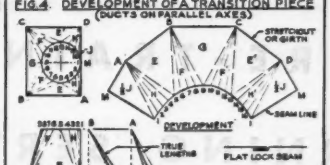
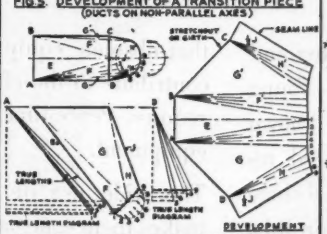


FIG. 4 SHOWS A TRANSITION PIECE FOR CONNECTING A ROUND DUCT AND A RECTANGULAR DUCT WITH PARALLEL AXES. SINCE THE CONICAL SURFACES F AND H ARE DIFFERENT, IT IS NECESSARY TO CONSTRUCT TWO SEPARATE TRUE LENGTH DIAGRAMS. THE PROCEDURE FOR DRAWING THE DEVELOPMENT IS THE SAME AS EXPLAINED IN FIG. 2 AND FIG. 3.

FIG. 5. DEVELOPMENT OF A TRANSITION PIECE (DUCTS ON NON-PARALLEL AXES)



THE TRANSITION PIECE SHOWN IN FIG. 5 JOINS A RECTANGULAR DUCT WITH A CIRCULAR DUCT. BY USING AN AUXILIARY VIEW OF THE ROUND OPENING, THE DIVISIONS FOR THE BASES OF THE OBLIQUE CONES CAN BE FOUND. HERE AGAIN IT IS NECESSARY TO SHOW TWO TRUE LENGTH DIAGRAMS, BUT, IN THIS PROBLEM THE ALTITUDE OF EACH RIGHT TRIANGLE IS OF A DIFFERENT LENGTH.

FIG. 6. DEVELOPMENT OF A WARPED SURFACE (DUCTS ON PARALLEL AXES)

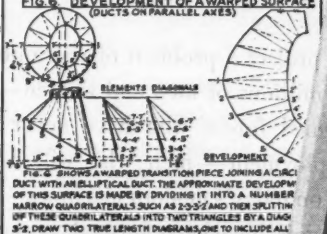


FIG. 6 SHOWS A WARPED TRANSITION PIECE JOINING A CIRCU DUCT WITH AN ELLIPTICAL DUCT. THE APPROXIMATE DEVELOPM OF THIS SURFACE IS MADE BY DIVIDING IT INTO A NUMBER NARROW QUADRILATERALS SUCH AS 2-3-3'-2' AND THEN SPLITTIN OF THESE QUADRILATERALS INTO TWO TRIANGLES BY A DIAGO 3'-2'. DRAW TWO TRUE LENGTH DIAGRAMS, ONE TO INCLUDE ALL ELEMENTS AND THE OTHER TO INCLUDE ALL OF THE DIAGONA TRUE SIZE OF THE ELLIPTICAL BASE IS SHOWN DOTTED IN THE 'D AND FOUND BY REVOLVING IT UNTIL HORIZONTAL ABOUT AN AXES L. DRAW THE DEVELOPMENT BY CONSTRUCTING THE TRUE SIZES O TRIANGLES IN REGULAR ORDER. THE DISTANCES 1-2, ETC., ARE TAKEN CORRESPONDING DISTANCES 1-2, ETC. ON THE TRUE SIZE OF THE ELLIP

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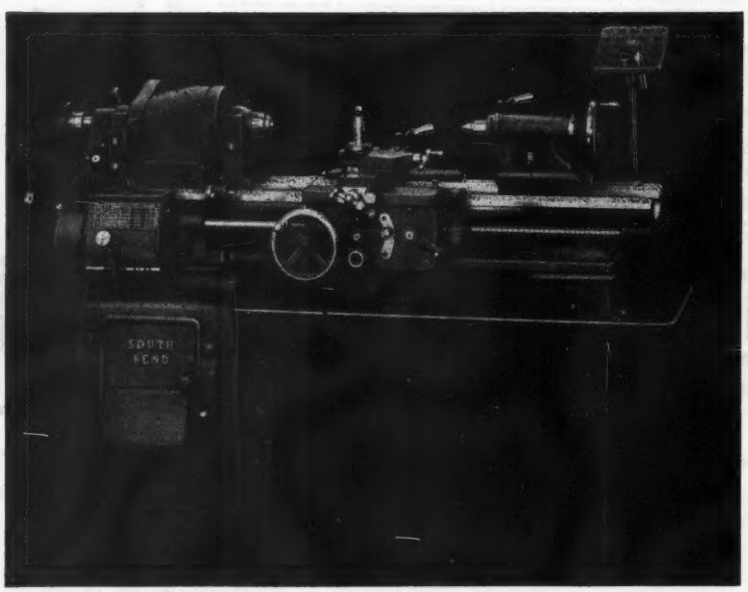

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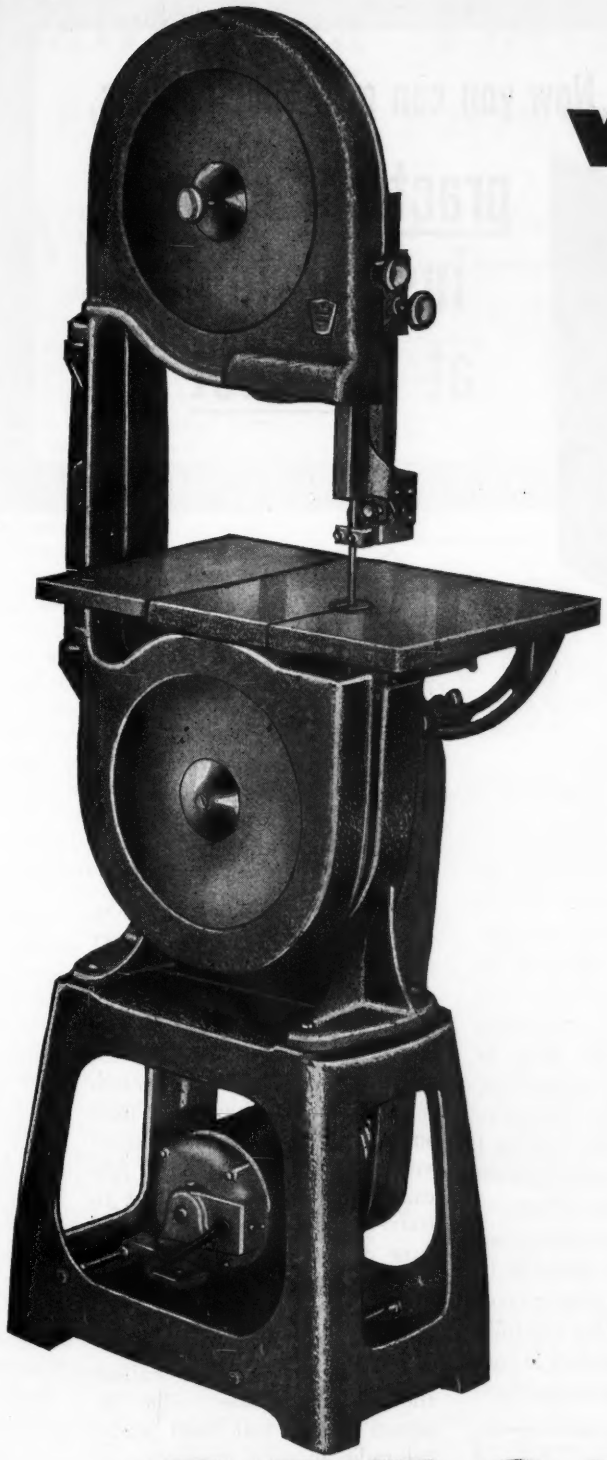

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California Polytechnic College:

A PATTERN FOR POSTWAR VOCATIONAL EDUCATION

BY *Julian A. McPhee*

The greater extension of vocational education into the thirteenth and fourteenth years of schooling is evident in postwar planning. One example of a public institution already offering this type of work is California Polytechnic College which has a unique "upside-down" arrangement of its curricular offerings. Mr. McPhee is President of California Polytechnic College and is also the recently appointed Director of Vocational Education for California. He divides his time between the two positions.

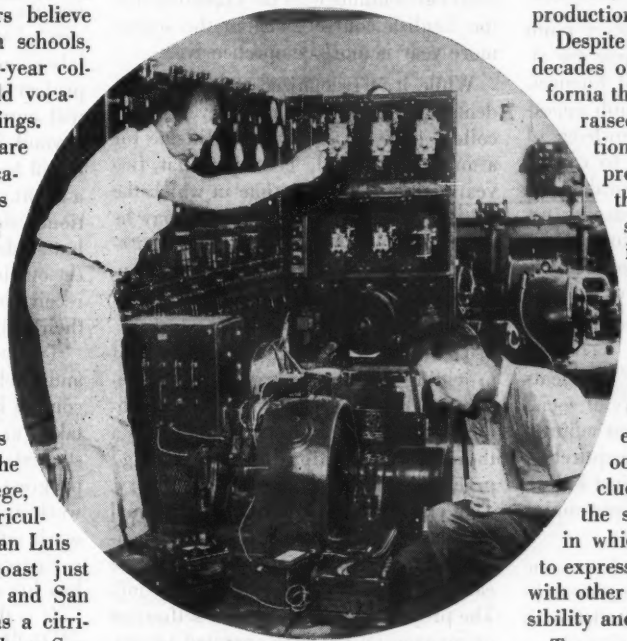
WHEN G. I. Joe comes marching home, when Sally the War Worker is displaced, and when Jimmy the Student starts looking for a postwar job, America will be face to face with a problem which is today unsolved. The educational provision of the G. I. Bill of Rights is only a partial solution to the problem of reconversion of individuals to a peacetime economy, and even that has a "two-way stretch" which may yet prove a threat to the American educational system.

Is vocational training one answer to the problem? Many educators believe that it is and numerous high schools, junior colleges, and even four-year colleges are planning now to add vocational courses to their offerings. Many states and communities are planning to introduce area vocational schools and educators responsible for such planning are scrutinizing various vocational schools for ideas.

In California there is one school which is not facing a "reconversion" problem but is already busy providing just the type of vocational training which the returning veterans are seeking. This school is the California Polytechnic College, state technical college for agriculture and industry, located at San Luis Obispo, California, on the coast just halfway between Los Angeles and San Francisco. The college also has a citriculture and horticulture branch at San Dimas about 25 miles southeast of Los Angeles, but all industrial courses are given on the San Luis Obispo campus.

It is no mystery why the California Polytechnic College is being singled out on the Pacific Coast as a model for other colleges or junior colleges contemplating the addition of agricultural or industrial vocational courses to their curriculum. When California Polytechnic was established in 1901, it was the forerunner in California of vocational education along agricultural and industrial lines.

No level of instruction was proposed in the legislative act which created California Polytechnic and it opened as a state vocational high school on October 1, 1903. It remained a vocational high school until 1927 when the thirteenth and fourteenth grade levels were added. In 1933, the institution was made a direct administrative branch of the State Department of Education and the Chief of the State Bureau of Agricultural Education was made ex-officio president of the college. In that same year the high-school courses were dropped and the school became a two-year technical college. This was in keeping with a broadened educational concept and the fact that by this time the district high schools were providing adequate vocational instruction at the high-school level.



Students of electricity running a test on a piece of equipment they have repaired as part of the instructional plan based on project work with commercial equipment.

By 1936 a third year was added to the curriculum and in 1940 the State Board of Education authorized the school to give four years of college instruction and to grant the Bachelor of Science degree in agriculture or industry. Courses in the industrial division now include: aeronautical industries, electrical industries, mechanical industries, and air conditioning-refrigeration industries. Agricultural majors include: animal husbandry, crops, dairy production, dairy manufacturing, agricultural mechanics, horticulture, agricultural inspection, fruit production, and poultry production.

Despite the fact that during the four decades of service to the state of California the level of instruction has been raised and the number of occupations for which training has been provided have been expanded, the basic philosophy of the institution has not been modified in the slightest degree. The function of instruction is to impart to the students those skills and sciences necessary to successfully perform the vocational and technical practices for which they will be employed. With the strictly occupational training are included those subjects which help the student understand the world in which he lives, which assist him to express himself, to live harmoniously with other people, and to assume responsibility and community leadership.

To carry out this objective of training for the maximum employability and earning power of every student, California Polytechnic College established a unique educational plan which is sometimes described as the "upside-down educational plan." This plan is characterized by the grouping of as many technical and job-getting courses in the first two years as possible. In the third and fourth years the student takes, in addition to courses in his major, those subjects considered as "background." The net result of this system is that the student who completes the four-year curriculum leading to a Bachelor of Science degree will have covered substantially the same course content as would be covered in a similar major in a typical agricultural-

A Civil Aeronautics Administration inspector (second from the left) watching two students reassemble a magneto as part of their final examination for an aircraft and engines license.

mechanics arts type college—but in an inverted order.

Under this system, at whatever point a student leaves school, as some are always forced to do because of finances, need at home, or immediate job opportunity, he has a maximum knowledge of skills which will enable him to earn a living. This educational pattern definitely improves the immediate earning capacity of those students who, for various reasons, complete their formal education after one or two years of college.

In addition to this one advantage of the "upside down" plan, it has been found also that the "degree" students have more interest in the study of social and natural sciences, and even cultural arts, when they first have acquired a thorough foundation of practical knowledge and skills relating to their major interest.

This plan makes it possible to run the two-year vocational and three-year technical curriculums closely parallel with the four-year degree program, and enables students who graduate with a vocational or technical certificate to return to school and, without too much shifting of courses, complete a final year or two leading to a degree. The longer curriculum varies principally from the two shorter programs in that a greater number of courses in the social, physical, and chemical science fields are given. For example, the degree curriculum in aeronautical maintenance and operations engineering in the first two years contains exactly the same courses in engineering drafting theory and practice, engineering mathematics, physics, aero construction theory and shop, aero engines theory and shop, machine shop, welding shop, and physical education as do the two-year vocational and three-year technical curriculums with the exception that the English course given in the sophomore year is more comprehensive.

While it is recognized that some students attend less than two years, the college does not offer any certificate for a one-year period, believing that two years is the minimum time in which the present choice of major subjects may be covered; nevertheless, both the institution and the student recognize the tangible value of even such short periods of enrolment as one year.

To further carry out the objective of providing specific instruction for specific occupations, California Polytechnic's administrators insist that there is a thorough integration of the "doing" practices with the underlying theory. The classroom instruction, the formal laboratory exercises, and the actual project experiences on a commercial scale are each used in their proper proportion. The project system consists of selfowned or managerial projects operated by students in such a way as to give every student a maximum opportunity to use his acquired skills and technical knowledge in the commercial production or marketing of agricultural products or in the construction, rebuilding, repair, or maintenance of industrial machinery and equipment on an equally commercial scale. This combination of the very practical "learn-by-doing" and "earn-while-you-learn" philosophies not only enables a student to earn money while doing work directly related to his major academic interest, but also creates an added incentive for the more rapid acquisition of further skills and knowledge to the end that the projects will be more profitable.

In the industrial departments of the college the projects are usually group projects rather than individual projects, although smaller repair jobs may be handled as individual jobs.

The aeronautical department provides a good example of how this project system works in the industrial division. The aeronautics department was the eighty-fourth government approved repair station to be established in the United States and operates under strict CAA regulations. In order to prevent criticism that the college is competing with commercial repair stations, the department accepts for repair only aircraft or engines which have been damaged beyond feasible commercial repair. The owner of the aircraft pays for all parts and materials at retail commercial prices and, since the school buys supplies through its project fund at wholesale prices, a small margin is made possible which takes care of waste of material due to student labor and provides a small profit to the project fund. Sometimes the project fund will purchase outright a plane damaged beyond feasible commercial repair and it will be rebuilt by students and sold for a profit. All student labor during instructional shop hours is done without pay but students assigned to work on a project outside instructional shop hours will receive hourly pay, at rates varying with their ability.

Two industrial subjects, machine shop and welding, are taken as required courses by all industrial majors and are taken as electives by many agricultural students. In all shopwork the student's progress is based on the quality of the work and the time required to turn the work out. Every shop is equipped with a recording time clock and each student has his own time card.

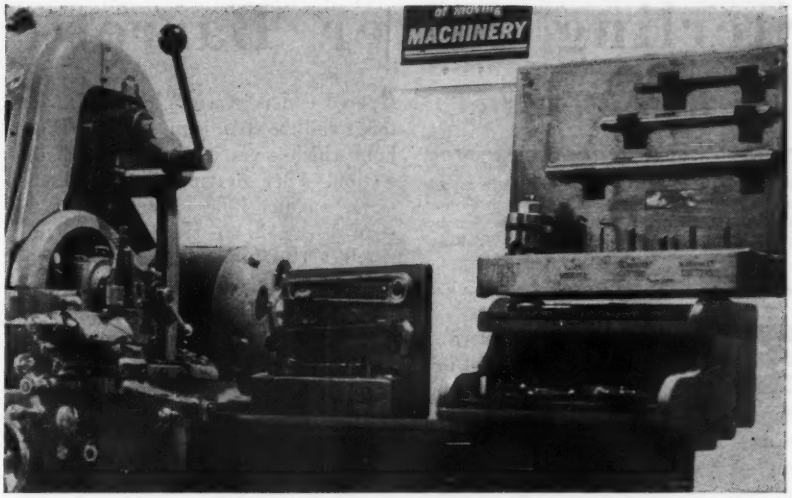
It is the opinion of the administrators of California Polytechnic that the admission of a student to this institution, and his progress through the school, should be based on demonstrated and continuing ability and interest, rather than the previous completion of a pattern of courses under a totally different environment. This institution recognizes the fact that high schools have a primary responsibility to provide instruction based on the needs of their individual communities. The institution therefore does not require as a basis for admittance a specified block of instruction to be taken in high school. The administrators of California Polytechnic appreciate the importance of high schools providing each individual student with the

(Continued on page 32)

3 Shop Aids

BY *G. H. Billingham*

The three items shown in the illustration can be adapted to the particular needs of any instructor who wishes to construct them or, better, have students make them as part of their instructional program. The author is Supervisor of Industrial Arts, Weehawken, N. J., High School.



TESTED INSTRUCTIONAL PROJECT

THESE three projects need to be custom built to fit the type of tools available in a school shop or the bed of a machine. They would also need to be adapted to the tool distribution plan in operation in a school shop. These three devices have been found useful in our shop and other instructors may also find them of value.

Socket Wrench Set Holder.—This replaces the metal holder that comes with the set. The features which make it particularly valuable for school use are: holes in back so it can be hung up in tool crib, portability, socket sizes marked on front, and accessibility of sockets and handles. Moreover, the completeness of the set can be checked by the tool keeper at a glance.

Turret Type Boring Set Holder.—This device holds all parts of a No. 970 turret type boring set as well as a boring bar holder made from the plans on page 6 of the May, 1944, issue of SCHOOL SHOP, an excellent machine-shop project. This holder has the sizes of the cutters stamped in front of their respective slots and other advantages similar to those mentioned above.

Machine Tool Shelf.—This project, which is set up on the end of a machine out of the operator's way, features two shelves. The upper shelf is for calipers, scales, micrometers, etc., while the lower shelf is for wrenches and other accessories. The shelf makes for good housekeeping and prevents the nicking and marring of lathe bed ways.

All of the above projects are attractively finished before being put in service. This helps to maintain a good atmosphere for precision work.

Machine Card

BY *Ernest A. Owens*

Student safety and careful maintenance of machines is promoted through the use of machine cards the author found. The plan can be easily adapted to other shops than woodworking. Ernest A. Owens is Instructor in Machine Woodworking and Director of Audio-Visual Education, Central High School, Chattanooga, Tennessee.

THERE are 15 power-driven machines in our woodshop. We instructors had to be on our toes to be certain that some over-ambitious youngster did not operate a machine without knowing how with disastrous effects to himself or the machine.

Conferences with other shop teachers disclosed that they used a multitude of means to protect students and machines although a few had either not given the problem any thought or had recognized it but done nothing about it.

Some of the methods used were as follows: Some gave instruction in the operation of machines to individual students as the need arose. Some let the students learn by the trial-and-error method. One let his students look at catalogs and manuals and learn how to operate the machines pictured and described. One had a large shelf of books on how to operate and care for machines. One drew sketches of the machines on the blackboard and gave long tiresome lectures on the "Proper Procedure to Operate Woodworking Machines and How to Care for Them." One instructor got disgusted and found another job. Many used the "buddy" system (a beginner teamed with an advanced student).

After observing these various methods we decided to install the following system. We had our printing department print 500 machine cards with the following legend on the front:

> Date _____
>
> _____ is qualified to operate the machines initialed on the reverse side of this card when approved and signed by the instructor.
>
> This privilege will be revoked if operator violates established operational and safety rules of any machine.
>
> Instructor _____

On the reverse side of the card was printed the following list of machines:

MACHINE CARD

Grinder	Large Cut-off Saw
Jig Saw	Sander
Small Band Saw	Large Band Saw
6-inch Jointer	Mortiser
Small Cut-off Saw	Shaper
Drill Press	Lathes
24-inch Jointer	Tenoner
Surfacer	

Each student was given a machine card to carry in his billfold after the purposes of the card had been carefully explained. Individual instruction was given on the operation of the various machines. When the student qualified, the instructor placed his initials after the name of the machine.

The system has been in effect for two years now with no serious injury to students recorded and the wrecking of machines completely eliminated. The abuse of machines has been cut to a minimum. The card has had an excellent effect on students. Teen-age boys like to carry a card of some kind to show. Few are

(Continued on page 32)

Sterling Silver Barrette

BY *Rufus Jacoby*

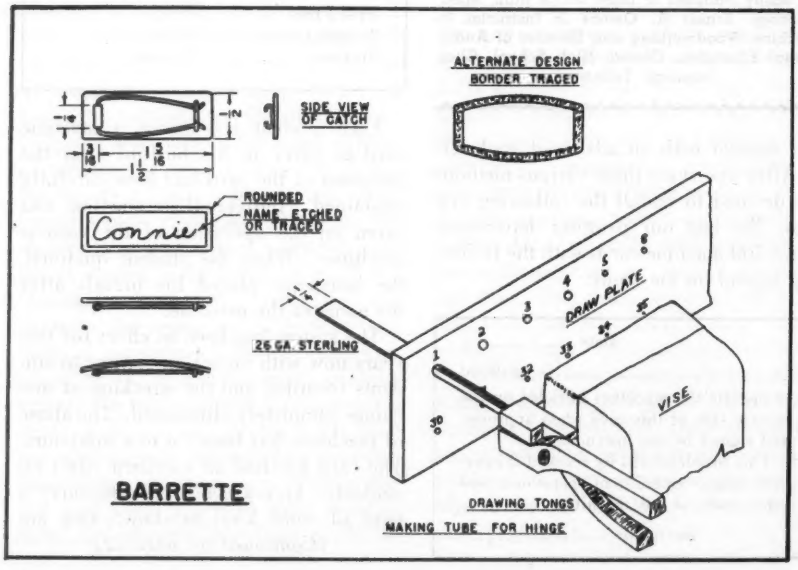
This project is excellent for beginners in metalcrafts and holds the possibility of correlation with the science department. Rufus Jacoby teaches in the Coolidge High School, Washington, D. C.

THE girl's barrette in sterling silver is a popular current job with boys and girls in beginning metalcrafts. It appeals to students because of its utility, cheapness, and simplicity while possessing the beauty and personal character of the commercial engraved product. The completed job, in sterling, costs approximately 20 cents. If sterling is not available, copper or brass scraps may be substituted. However, these metals need to be silver plated.

From an educational point of view, the job has worthwhile and challenging processes for the student, such as tube making, hard soldering, etching, designing, and finishing. Each student is required to sketch his own design and write out the steps in the procedure before getting his material.

Students are fascinated by the process of tube-making, which can be compared with the making of seamed piping in industry. The tube is made of a piece of 26- or 28-gauge metal at least 4" long x ¼" wide, tapered at one end to pass through the largest (No. 1) hole in the round draw plate. The draw plate is held in a vise with protected jaws. The tapered end is grasped by the drawing tongs and the strip is pulled through the hole which gives it a ¾-round shaped section. After drawn through successively smaller holes, the edges of the strip meet and a perfectly formed tube results. This tube may be drawn until the desired outside or inside diameter is obtained. The tube should be annealed after every third drawing. Annealing is accomplished by heating to a dull red. The oxide is removed by immersing while warm in dilute sulphuric acid. The joint in the tube need not be soldered. However, it can be soldered by placing flux and a small snip of silver solder inside the tube and heating the outside of the tube. Solder runs toward the heat thus it runs into and along the joint. The ¼" pieces of tubing are cut off with a jeweler's saw (No. 2 blade).

The plates are cut out in quantity on the squaring shears. Edges are filed and rounded, corners rounded with a half-round needle file. The surface is smoothed with crocus cloth and scrubbed with a tooth brush, soap, and warm water. Care must be taken not to touch the plate with the fingers. When the plate is dry lay it on a clean piece of paper and apply a thin, smooth coat of molten beeswax to the surface and edges with a small camel's hair brush. The name is written in the wax with a sharp pencil, the pencil point touching the metal. Check carefully to see whether the silver is exposed for each letter. The name should be clearly seen on the silver plate.



Prepare in a glass dish enough etching solution of 50 percent water and 50 percent nitric acid to cover the plate and immerse the plate in the solution. (Pour acid into water.) Bubbles rising out of the letters indicate that the metal is being eaten. If large bubbles cover the letters, wash them off by stirring the solution. The time required for etching varies from 15 minutes to an hour, depending on the depth of the etching desired. The beeswax is removed by heating the plate and wiping with a waste cloth. A desirable effect is obtained by decorating the border with background chasing tools. This distinguishes the hand-made product from the commercial.

The tube and catch are silver soldered to the back. The 18-gauge wire is inserted through the tube, formed, and cut to length. The job is finished on the buffer using tripoli and rouge and washing in hot soapy ammonia water.

NOTE: An alternate method of etching is to paint the edges and a border with asphaltum varnish and write the name on the plate in asphaltum with a straight ink pen point. After the front is dry, cover the back with beeswax and proceed with acid bath. This method produces an etched background and raised letters.

"Well Begun Is Half Done"

BY *Howard Henry*

Central High School, Akron, Ohio

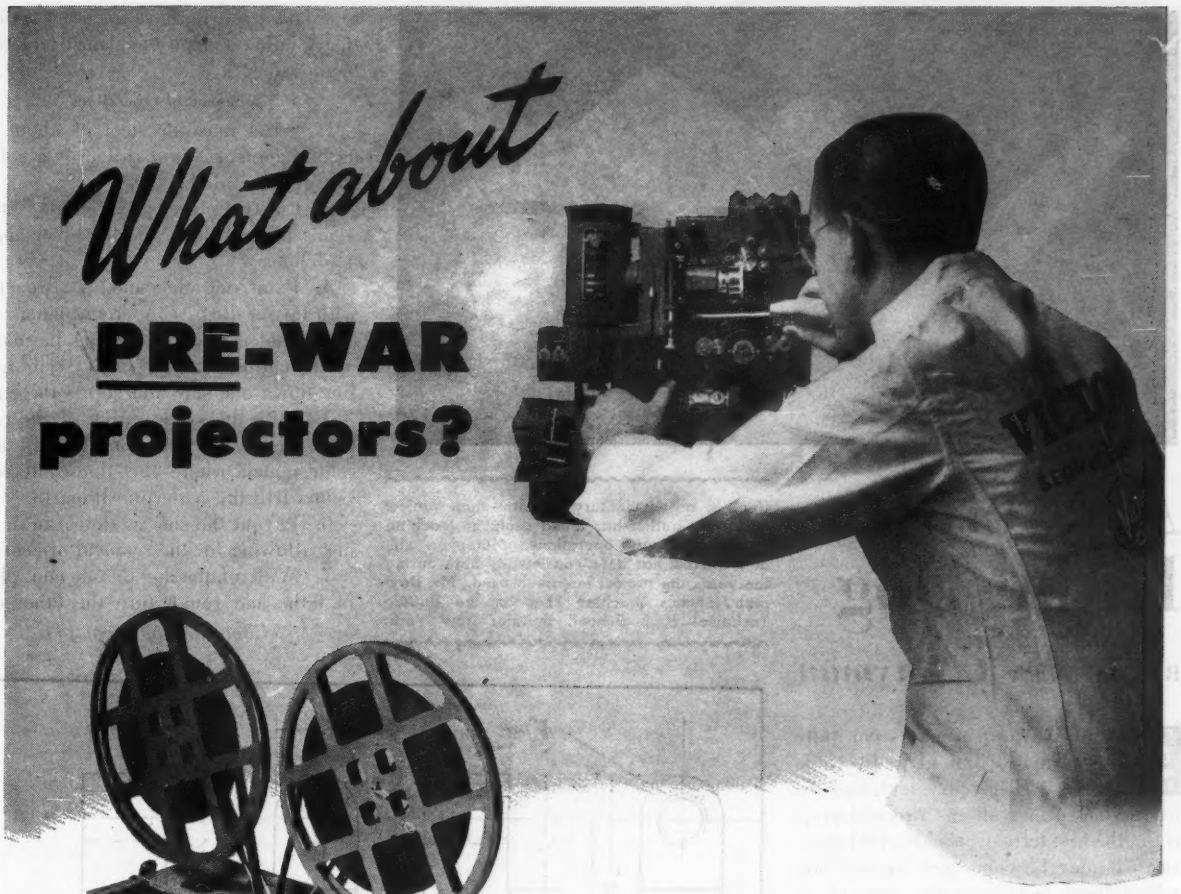
PROBABLY the most frequent cause of poor school shop workmanship is students' haste. No matter how thoughtfully a project is conceived, how carefully planned on paper, and how enthusiastically the actual work is begun, its skillful completion requires patient attention to small details. That is the great lesson which the adolescent worker must learn. Often he never learns it.

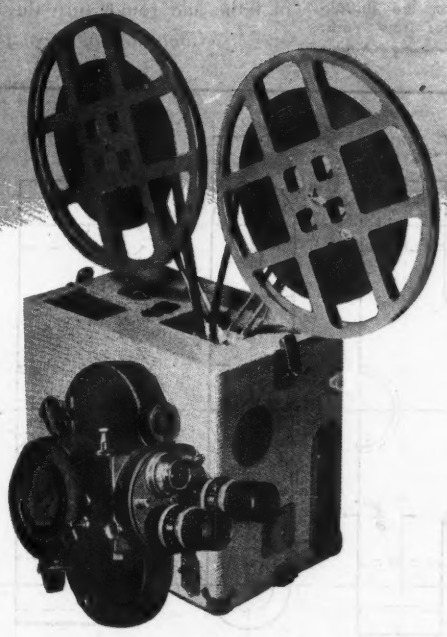
A highly successful device for improving workmanship is the *preliminary inspection* and *evaluation* of a project. Choosing some important step near the beginning of the project, the instructor inspects it, and criticizes and evaluates the work done.

The point at which this inspection occurs should be at a key step in the project, such as the squaring-up of the first piece of wood or the layout before the cutting of a sheetmetal object. This

(Continued on page 22)

What about PRE-WAR projectors?





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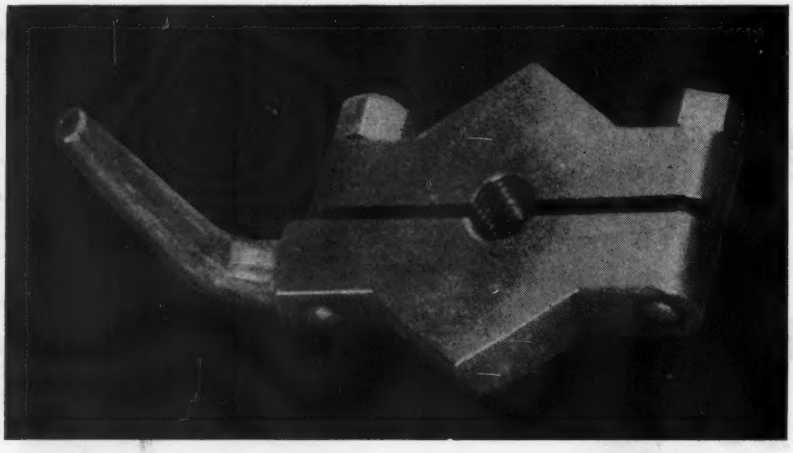


A Useful Lathe Dog

BY *Aubrey C. Dayman*

Here is an elementary machine-shop project which the author has found useful in teaching many machining operations. Moreover, student interest has been consistently high during the years the project has been used. Mr. Dayman teaches machine shop in the Buffalo Technical High School, Buffalo, New York.

TESTED INSTRUCTIONAL PROJECT

THIS project may seem quite advanced, but in reality it is very elementary and may be carried on successfully as a second project in the first term of machine-tool practice. It may be completed by one boy where there is a generous amount of practice allowed; or it may be given to two boys where time and material are limited. If it is given to two boys to make, the boy making the short piece does not have taper turning. This lack may be satisfied by having him make a centerpunch or other elementary taper-turning project.

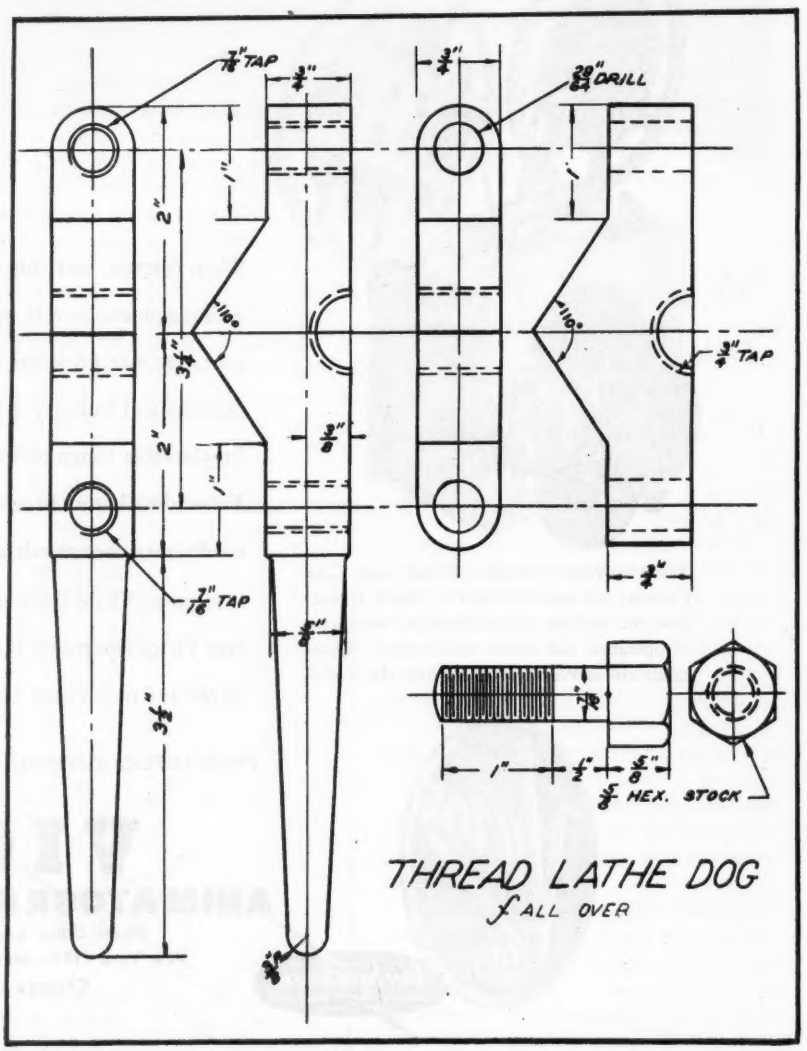
The project not only has educational value but is useful in the shop. It was first used as a regular lathe dog by cutting a 90° "V" in the center, but, as a regular lathe dog, long screws are required and lathe dogs with long projecting screws are dangerous. It is more adaptable as a dog for turning and threading studs, test specimens, or any work on which a thread is needed on each end. In such a case the center of the lathe dog should be drilled and tapped as shown in the drawing.

An inventory of the instructional material shows that in addition to the selection and cutting of material, the boy has layout work including centering, rough turning and finishing, use of compound rest, taper turning, drilling and tapping, shaper work, filing and finishing with abrasive cloth, heating and bending, case hardening or carborizing. The screws may be turned and threaded on an engine lathe; but we have made these on a turret lathe as a problem in production methods.

Sequence of Operations

1. Select machine steel of about 30 carbon content. Cold rolled or a softer steel may be used.
2. Cut two pieces of ¾" x 1½" steel —one piece 8" long and the other about 4½" long.
3. Paint one side and the two ends with layout die or copper sulphate.
4. Center work by setting hermaphrodite calipers to ⅜" and scribing a line down one side and across the ends.
5. With the same setting of the calipers, bisect the lines on the end and centerpunch where the lines intersect. Centerdrill the centerpunch marks.
6. Layout the side as shown in drawing, allowing for the removal of centers.
7. With a lathe dog on one end, place in lathe and rough turn the other end

(Continued on page 14)



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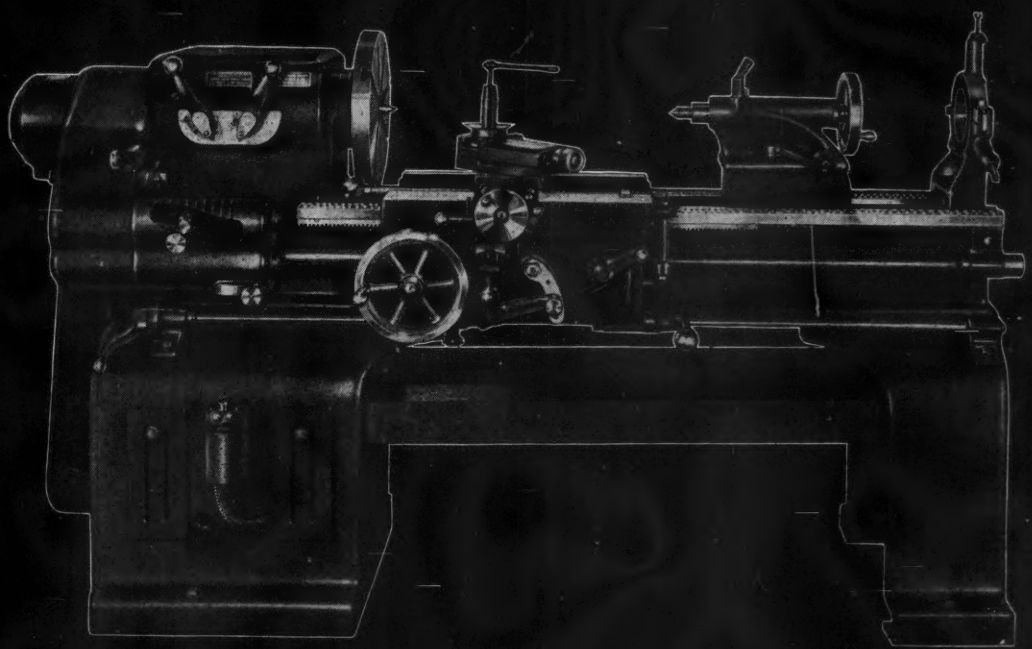

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to the layout line and face the end to the length but maintain the center.

8. Reverse in lathe and rough turn the remaining end to the layout line but maintain the center.

9. Set the compound rest at 55° with the cross slide and turn one side of the angle down to the layout line with a round-nosed tool of about 1/16" radius.

10. Reverse work in the lathe and turn the other side of the angle down to the layout line.

11. NOTE: The student who has the small part should place his piece in the shaper and face the surfaces where the screws go through to screw into the large part of the dog. This is not necessary on the large part.

12. NOTE: While the small part is being faced for the screws, the other part should have the taper turned for the tail of the dog. Round the end and leave as little of the center in as possible. The procedure is to calculate for the offset of the tailstock or the set of the taper attachment; rough turn the taper; finish turn the taper; file and finish with abrasive cloth.

13. Lay out the ends of the short piece in preparation for drilling the 29/64" holes to a scribed circle and rounding the ends.

14. Suggestion for drilling the 29/64" hole: (1) Drill a small hole about the size of the centerpunch mark first. A larger drill will follow the small hole accurately. (2) Another suggestion is to make a jig the exact size of the small piece. This will not only serve as a jig, but also for a gage to fit all the small parts being made in the class.

15. Inspect the two inner faces of the pieces to see that they are both flat and square. If they are not, take a very light cut off each on either the shaper or the surface grinder.

16. Clamp the two pieces of the dog together and fasten to an angle plate. Spot drill the large piece through the small piece.

17. Calculate for the size of the tap drill for 7/16-14 and tap drill the large piece with the same setup.

18. Tap both holes with the 7/16-14 tap with the same setup.

19. Take from drill, clean off the burrs, and assemble with a strip of 16- or 18-gage metal between them and with two 7/16-14 screws. Draw the screws up tightly.

20. Lay out the center of the lathe dog for the desired diameter of screw. (NOTE: A set of dogs may be made to take screws from ¼" up. For small sizes, two or three sizes may be drilled and tapped in the same dog. This is not advisable for sizes above ⅜".)

21. Drill and tap for an 80 percent or 85 percent full thread.

22. File and finish ends round as shown in drawing; and file and polish all flat surfaces.

23. Catch the finished dog in a vise between copper jaws and with an acetylene torch heat the tail of the dog close to the body; and with a pair of well fitting tongs, grip the tail firmly and bend to the desired position. (NOTE: It is advisable to make a handle 12" or 14" long with a Morse taper in the end. This handle, slipped over the tail, is better than the tongs for bending as it does not scratch the work.)

24. Dismantle, file away all burrs, and stamp the size and threads per inch on the side.

25. Case harden or carborize all parts according to the kind of steel used.

26. Reassemble for use in the school shop.

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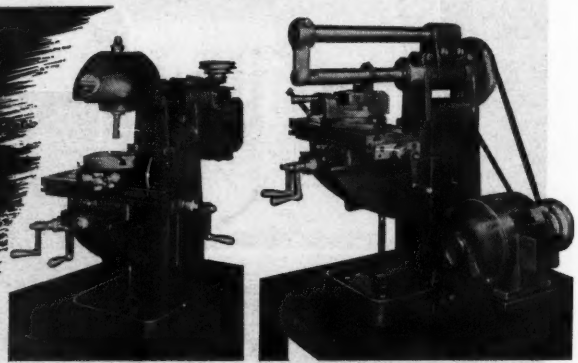

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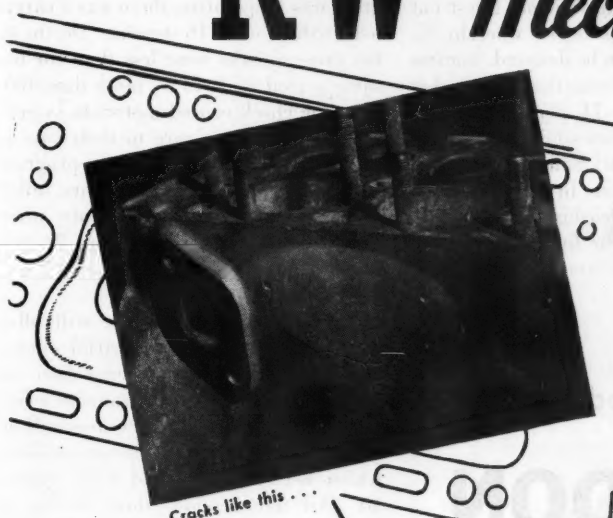

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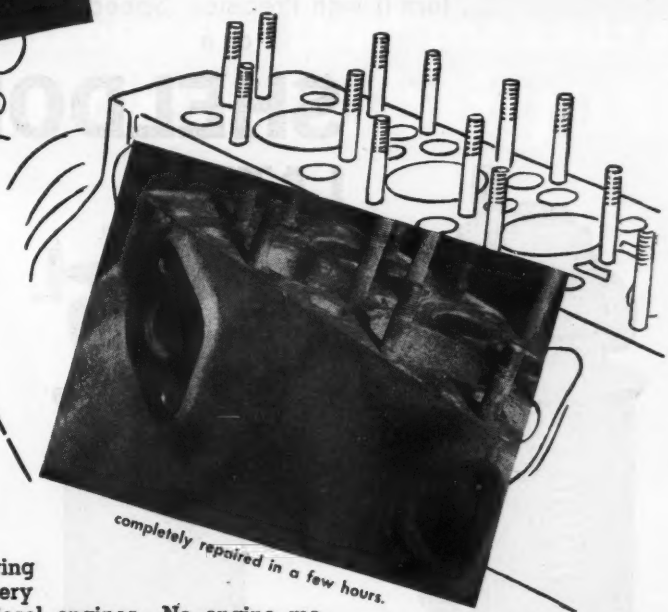

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news

WHAT'S DOING IN THE FIELD OF INDUSTRIAL EDUCATION

TO SAVE passenger cars from the scrap heap, to maintain adequate transportation for war workers, and to reduce traffic accidents, the nation's police are making final plans to conduct a brake check program in every state, to begin April 15 and end June 1. While the program is sponsored by the International Association of Chiefs of Police, to be entirely effective it must have public acceptance and support. Shop teachers of automechanics will want to promote the program. The brake check is not a test but a sound enforcement device whereby inadequate brakes can be detected. Figures from 12 states indicate that bad brakes account for up to 11 percent of fatal accidents. A program similar to the one to be conducted nationally was applied last year in Michigan. In that state, accidents had been increasing for seven consecutive months. The first month of the program, fatalities were less, as compared with the same month of the previous year, by 33 percent. In the second month, they were fewer by 31 percent, and in the third month, when the program was inoperative, there was a carry-over reduction of 16 percent. Deaths in the three months were less than for the same period of 1943 by more than 100. That the check caused motorists in general to give better care to their cars is shown by the fact that when the program started, one of every seven cars failed to meet brake check requirements; when the program ended, only one of 23 cars failed to meet requirements.

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PENNSYLVANIA State College will offer courses in vocational industrial education and industrial arts education on both graduate and undergraduate levels this summer. Most of the courses will be offered in the main summer session, which begins July 2 and ends August 10. An inter-session, three weeks in length, begins June 11 and ends June 29, while a post-session will be held from August 13 to August 31. Short unit courses are available and students may plan 2, 4, 6, 9, or 12 weeks of study, and complete from 2 to 12 credit hours of work. Requests for catalogs and other information should be sent to the Director of the Summer Sessions, The Pennsylvania State College, State College, Pa.

A SERIES of industrial safety charts now in preparation by the Division of Labor Standards of the Department of Labor has been designed to point out the hazards and dangerous practices associated with various jobs. Each set of charts covers one particular piece of machinery and illustrates both the safe and the dangerous method of doing the job. All copyright restrictions are waived on the charts so that they may be reproduced or used in any way to promote safety for workers. The first set deals with drill presses and is available now, while an issue on circular saws will be out soon. Others will be published each month. For copies, write to James V. FitzGerald, Director of Information, U.S. Dept. of Labor, Washington 25, D. C.

INDUSTRIAL arts teaching as a career is thoroughly discussed in an attractive illustrated leaflet available from Dr. John R. Ludington, Industrial Arts Dept., North Carolina State College of Agriculture and Engineering, the University of North Carolina, Raleigh, N. C. It is excellent for use with high-school students considering teaching as a profession.

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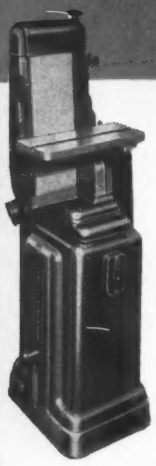

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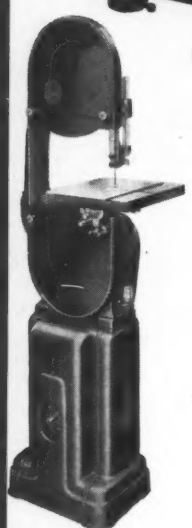

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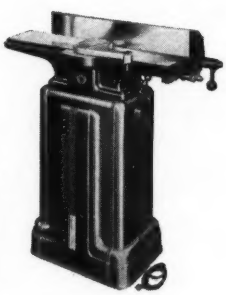

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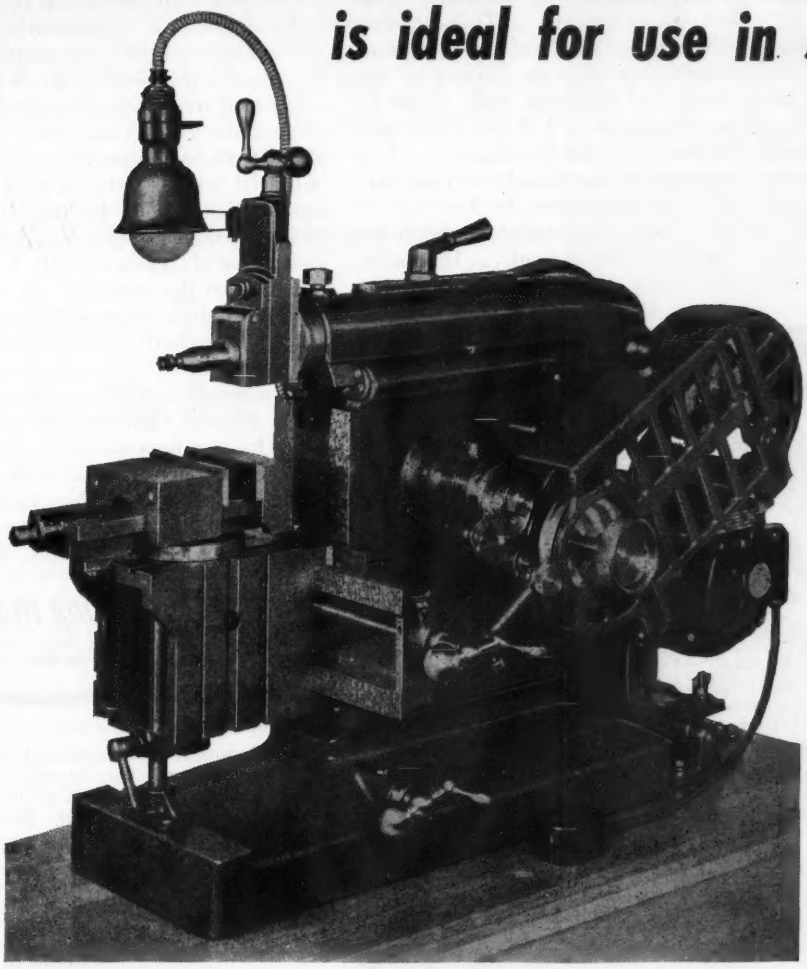

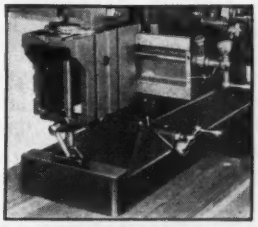

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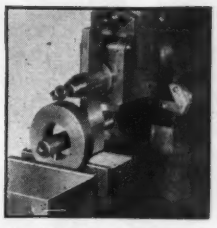
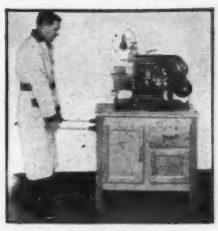


★ Handles a wide variety of work.



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Students quickly acquire ability to produce accurate work on this precision machine

Leaders in school shop instruction unreservedly recommend the AMMCO 7" PRECISION SHAPER. It is small in size, but it is mighty in efficiency and precision... It incorporates all important features of larger machines selling for hundreds of dollars more than the Ammco . . . and users of the Ammco tell us "it's the finest made". . . Simplicity of operation, plus special safety features, make this machine ideal for student use. A wide variety of work can be done on this shaper, and as one instructor has said —"it is a precision machine of a thousand uses."

Made for bench installation, or as a portable unit.

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ABOUT YOUR FELLOW TEACHERS

ED CHERRY, one of the pioneer Stanley Tool salesmen, died suddenly at his home February 10. Employed by the company since 1889, Cherry had a deep interest in the school field. He was instrumental in helping to establish the Educational Department at Stanley Tools in 1923, and since 1932 had devoted full time to educational work east of the Rockies. . . . OTTO A. HANKAMMER, professor of industrial and vocational education, will become head of that department at the Kansas State Teachers College, Pittsburg, Kansas, as of July 1, succeeding WILLIAM T. BAWDEN on his retirement. . . . O. N. BENNETT of Central Intermediate School, Wichita, Kansas, has taken the position of machine shop instructor made vacant by the resignation of J. I. MICHAELS, who has accepted a job in industry. . . . J. Q. GAUBERT has been transferred from Murray Hill High School in New York to the drawing department of the Bronx Vocational High School. . . . The Society for Visual Education, Inc., Chicago, announces the appointment of JOHN H. SKINNER, JR., to the post of editor-in-chief, in which position he will coordinate the editorial activities involved in the production of educational slidefilms and slides, and the accompanying manuals. Skinner served for 18 months with the armed forces, most of his work being in army training programs and methods and the use of visual aids. . . . W. DOW SMITH has resigned his position of industrial arts instructor at the Central Junior High School, Elkhart, Ind., to become manager of the National Rifle Association of America. . . . R. H. SNITZ, retired from the industrial arts department of Indiana State University last July, died recently at his home near Louisville, Ky. . . . MYRON H. BUEHRER, sales manager of the Boice-Crane Company, Toledo, Ohio, for the past 12 years, has just been elevated to the position of general manager. . . . B. PAUL ROSS, of the Beaver, Pa., Vocational High School, has become dean of Alderson-Broaddus College, Philippi, W. Va.

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IN THE Morning Mail . .

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Gentlemen:

SCHOOL SHOP is always good but I think the current issue is particularly valuable. I found several bulletins, etc., which I would like to own. Enclosed is a check list. Thanks for sending them to me.

H. R. JENNEY,
Head of Vocational Dept.,
Mackenzie High School,
Detroit, Mich.

[One of the prime objectives of SCHOOL SHOP is to make teachers acquainted with the valuable materials industry has to offer them in the way of instructional aids. We are happy to pass along requests of this sort from our readers to industrial concerns.—*Editor.*]

Gentlemen:

I have been wondering if in your columns you might list my name as being interested in an exchange arrangement with a teacher in the New York City region in New York State for the 1945-46 school year. My subjects are millwork, cabinetmaking, and industrial arts.

J. C. UHTE,
George Washington High School,
San Francisco, Calif.

Gentlemen:

Enclosed is 65c for which please forward me as soon as possible one copy of *Mechanical Drawing Guide Workbook* by Seaton H. Smith as advertised in your splendid paper. Your publication is the most helpful and informative periodical I receive. Keep up the good work.

ALBERT O. PLANTINGA,
Somerville High School,
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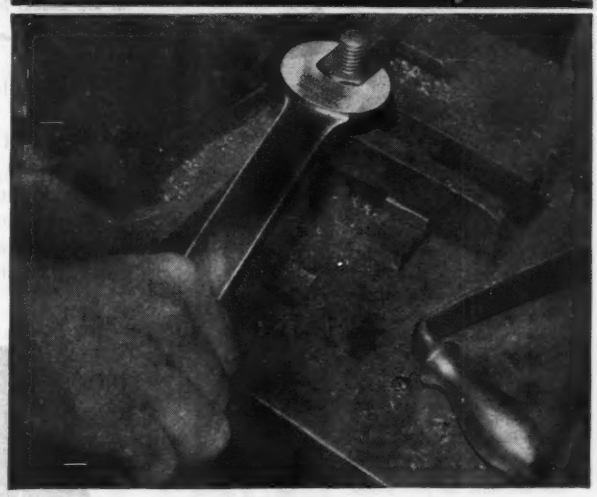

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● Although one of the most commonly used hand tools, wrenches are frequently misused by mechanics who should know better. Data Sheet No. 22 is brief, to-the-point, well-illustrated . . . and should be "required reading" for all embryonic craftsmen.

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8. Types of "Superior" Wrenches.
9. Use of "Supersocket" Wrenches.
10. Data on Eye Bolts.
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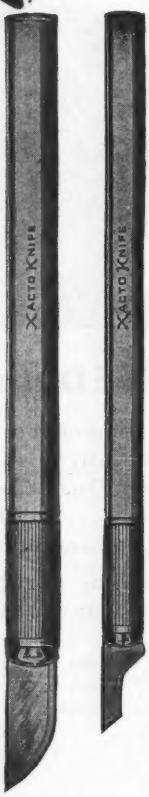

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KIT NO. 82—Furnished with 3 handles, 12 blades and fitted wooden chest. $3.50

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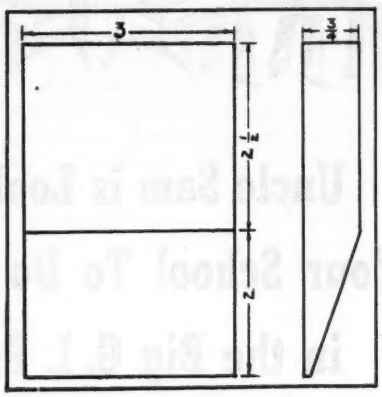
Designs for Door Wedges

BY *Agnes Choate Wonson*

Teachers of elementary woodworking or craft classes will find that pupils are much interested in these wedges. Mrs. Wonson teaches in the Essex, Massachusetts, schools.



TESTED 55 INSTRUCTIONAL PROJECT

OUR boys' craft class has enjoyed making door wedges, two of the most popular designs for which are shown here. The panda and penguin are about 8½" high. Scrap plywood or quarter-inch stock can be used. Black and white enamel is excellent for finishing these two designs.

"Well Begun" *from page 10*

inspection should occur early in the work on a project so that it may serve as a guide to what the instructor expects of further operations. Furthermore, with early inspection it is not too wasteful to advise the student to scrap a faulty piece and begin over again.

Where a formal grading system is used in shop this preliminary inspection should become as much a part of the student's record as the completion grade.

The old adage, "Well begun is half done," is applicable to shop work because it implies an initial attitude of alertness and concentration which may well carry through to the completion of the project if encouraged by the instructor. A natural way to encourage a good beginning is to recognize and commend a good beginning or show how to improve a bad beginning.

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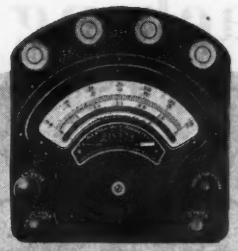

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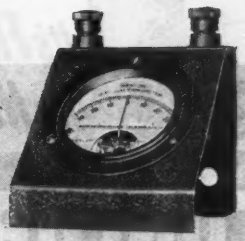

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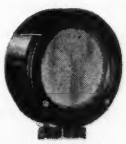

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Teaching Distribution

Number 3 in a Series on Technics of Teaching Printing

BY *R. Randolph Karch*

The technics described here have been used advantageously by the author in his teaching. He is on leave as a Lieutenant in the USNR from his position as principal of the Graphic Arts High School, Cincinnati, Ohio.

JUMBLED and pied type cases, bogy of the printing instructor and student, are caused by accidental and wrong distribution. No student will maliciously mix a type case. He *knows* he was right—and still the case is dirty. "It must have been somebody else—I'm sure *I* was right," he says. He is *sure*, he is *honest*, and yet the cases are pied!

Three sure-fire procedures for correct distribution can be insisted upon by instructors to eliminate dirty type cases.

Technic No. 1—

1. Always *compare:*
   a) *Face* of the type.
   b) *Nick* of the type.
   c) *Size* of the type.
2. Always *read:*
   Read *every* word distributed—*never* distribute letter-by-letter.
3. Always *find* dropped type:
   When letters are dropped accidentally—put down your type *immediately*, and *hunt* for the dropped type until found.

Technic No. 2—

Just as specifications are made on layouts for *setting* type, specifications can be made for *distributing* type:

1. Get a copy of the printed job, or proof the standing type.
2. Examine the proof, and by memory and by reference to type samples, mark the
   a) *Kind* of type, and the
   b) *Size* of type.
3. Get an OK from the instructor.
4. Distribute by reference to the specifications marked on the proof. Use rules for distribution outlined in Technic No. 1.

Technic No. 3—

1. Place all sizes of each kind of type into separate galleys, or separate them by furniture in one galley.
2. Arrange type of each kind into sizes, smallest on top.
3. Prove each galley.
4. Distribute, using rules outlined in Technic No. 1.

General Considerations

In almost all cases, nicks of the various foundry types differ with the sizes and faces in the same type family. Two faces rarely have the same nicks. Therefore, students should be well acquainted with this indexing system of nicking type for recognition.

Monotype-cast types have identical nicks, because they are cast on the same mold, and the mold has one nick. This fact *must* be pointed out to students—comparison of nicks is no criterion in recognition in Monotype-cast type. Comparison of *face* is the only way.

Thompson Typecaster type faces *can* be nicked in any combination to differentiate between faces and sizes—but usually are not. If you order this kind of casting, request special nicking.

Foundry- and Thompson Typecaster-cast spaces can be nicked as follows: three nicks for 3-em spaces, four nicks for 4-em spaces, and five nicks for 5-em spaces.

It is recommended that beginners in industrial-arts printing classes be allowed to distribute directly from the composing stick until they find the "feel" of the type. This procedure will help to keep cases clean, because less type will be dropped. It is not recommended for vocational printing students, because this procedure is not accepted trade practice.

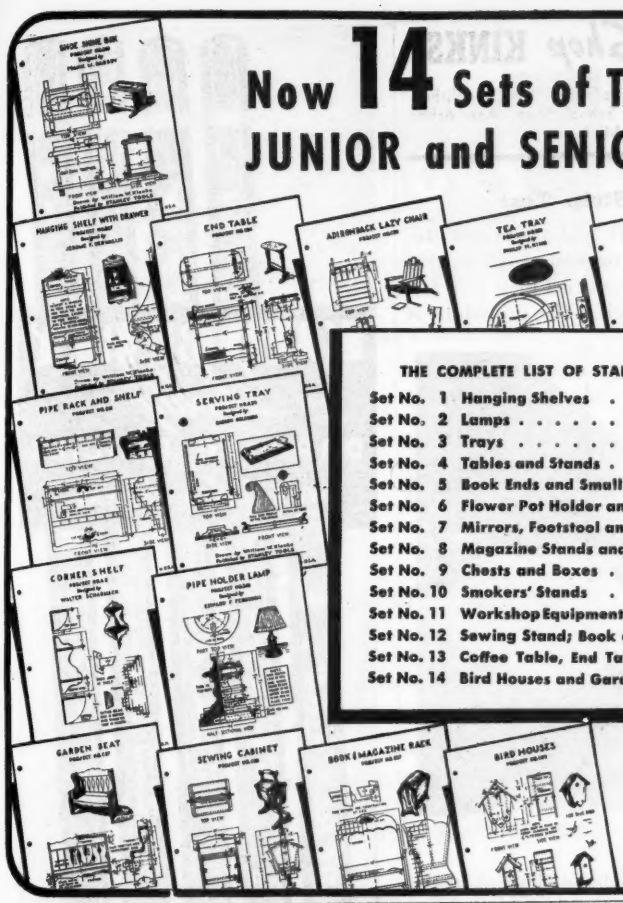
Nothing is more boring to students than to be assigned to "clean up the cases." The more vigilance on student distribution, the less often these assignments must be made. From a motivation standpoint, it is better to have an entire class clean cases at one time than to assign certain individuals in a class to do the job. When "everybody does it" it is not so hard to take!

Hell boxes should be eliminated, except one kept only by the instructor. Students should not have access to it. Good type—though pied—has a very bad habit of finding its way into a hell box!. How it gets there, nobody seems to know!

Lead and slug cases into which the material is pushed endwise are harder to keep clean than cases into which one can readily see. Also, material must be man-

(Continued on page 32)

Now 14 Sets of TESTED PROJECT PLANS for JUNIOR and SENIOR HIGH SHOP STUDENTS



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Each plan is printed separately on an 8½" x 11" sheet of tough paper. Only 10¢ per set of 5 plans. Select the sets you want and order today. Send coin or stamps.

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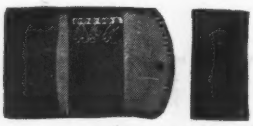

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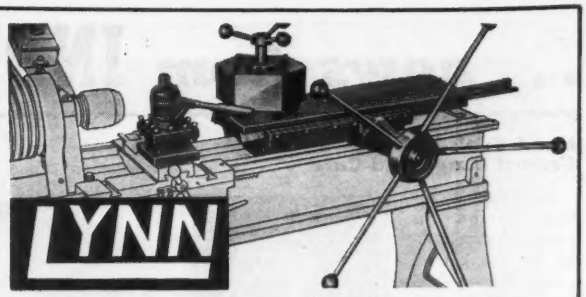

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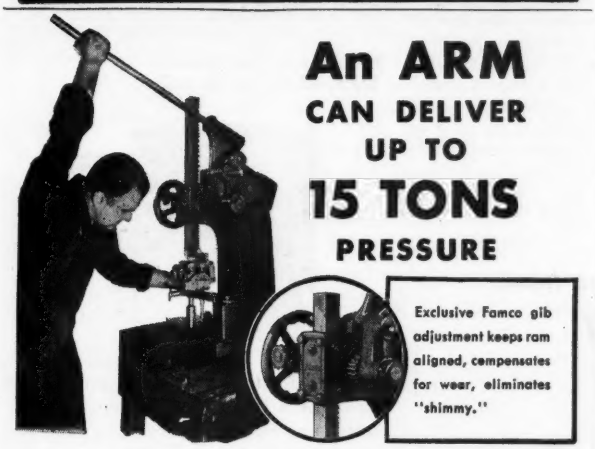

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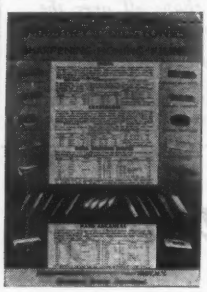
General Motors Corporation announces a new booklet on the correct usage and care of hand tools. Prepared originally for use in the Armed Forces, the booklet is cleverly written and illustrated. Cartoons depicting "how not to use hand tools" are scattered prolifically throughout sections which cover screwdrivers, wrenches, machinist hammers, chisels, files, hacksaws, micrometers, measuring units, etc. Glossary. Write General Motors Corporation, Detroit, Michigan, *or check number 67 on the coupon.*

New Behr-Manning Chart on Industry's Oilstones



A full-size 13" x 18" wall chart of India, Crystolon, and Hard Arkansas Oilstones for honing, sharpening, and filing is available for the asking from Behr-Manning Corporation of Troy, N. Y. Printed in color on heavy Bristol board, the chart gives complete descriptions of the abrasives, stone sizes, shapes, recommendations, and uses. For your copy write to Behr-Manning, Educational Department, Troy, N.Y., *or check number 68 on the coupon.*

Sono-Vision Automatic Sound Motion Picture Projector

Latest information on Mills Industries, Inc., portable selfcontained automatic projector is given in a new brochure available from the company. For continuous showing no attendant is required and the combination of special lens, screen, and rear projection makes darkened rooms unnecessary. The cabinet's two sections are detachable for easy handling and moving. Film capacity of 1600 feet of standard 16mm sound film in black and

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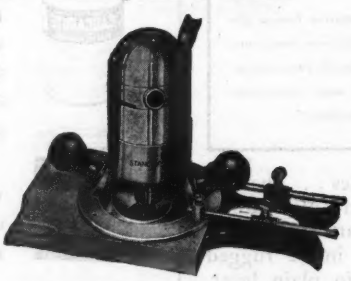
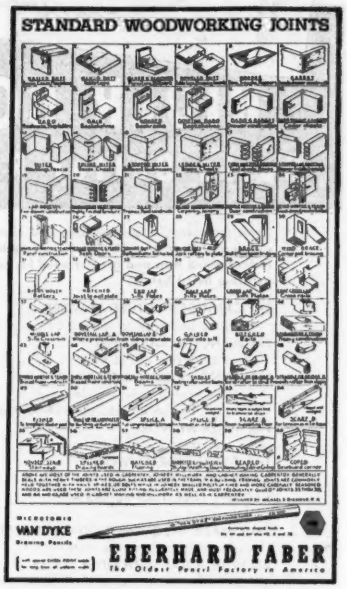


Stanley Electric Tools announces a new and improved design in its No. 10A hand router for routing, relief work, carving, and inlays. The router is supplied with attachments for dovetails, beading, and fluting, templet work, and many shaping operations. A push-button shaft lock for changing bits or cutters, or for removing or replacing chuck or shaper spindle is one of the new features. The switch lever is lodged in a recessed section of the housing so that it will not turn on accidentally. Write Stanley Electric Tools, New Britain, Conn., *or check number 70 on the coupon.*

Wall Chart of Standard Woodworking Joints



Eberhard Faber Pencil Company announces a new wall chart of standard woodworking joints. The chart is 16½"x27" and is of heavy paper which may be cleaned easily by simply wiping with a damp cloth. For your free copy, write to Eberhard Faber, 37 Greenpoint Ave., Brooklyn 22, N. Y., *or check number 71 on the coupon.*

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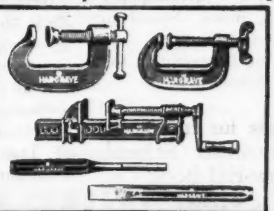

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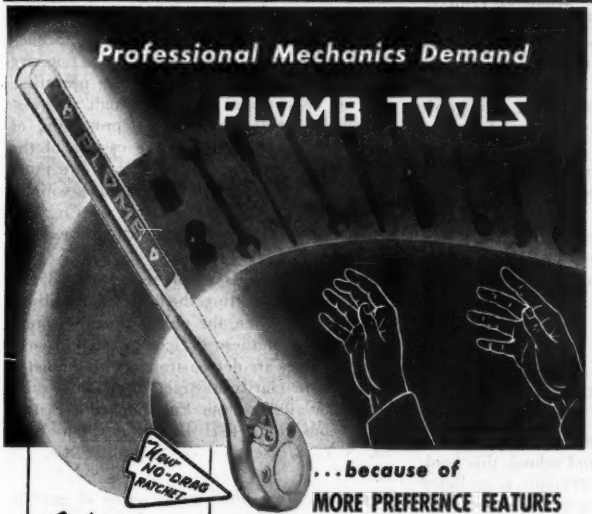

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BOOKS:

What is Vocational Education? Fern. Chicago: American Technical Society, 1944. Pp. 159. $2.50.

Various aspects of vocational education are discussed in this book, with a view to postwar planning. In order that such planning may take full advantage of all that has been accomplished in the field of vocational education, general educators must understand its philosophy, purpose, operating plans, and accomplishments. Vocational educators themselves must clarify their thinking, reevaluate their objectives, and summarize their debits and credits as they participate in planning the future of education. The book discusses definitions, philosophy, place of the various divisions of vocational education, teachers and teaching devices, relation to the single school system, and relation to current war work. Indexed.

George H. Fern is director of the Michigan State Board of Control for Vocational Education, state director of Vocational Training for War Production Workers, and of Food Production War Training.

Labor in America. Faulkner, Starr. New York: Harper & Brothers, 1944. Pp. xiii + 305. $1.60.

Beginning with a discussion of why the pupil should study labor relations in conjunction with modern democratic life, this book proceeds to a history of labor and finally a discussion of its place in America today. Only such historical events as apply directly to an understanding of the present-day system are used. No attempt is made to lead the student to think that he can "solve" social problems in the sense of causing them to disappear; rather the book is designed to help the student reach decisions, through clear thinking, about matters which affect him and thus help him to do his part in realizing the promise of the American way of life.

Harold U. Faulkner is professor of history at Smith College, and Mark Starr is educational director, International Ladies' Garment Workers' Union.

The Industrial Supervisor. Amiss, Sutton. New York: Ronald Press Company, 1944. Pp. x + 243. $3.00.

For all supervisors who want to improve their judgment, skill, and understanding, this book is suitable for use in any training department or for home study or small group discussions. Topics discussed are the minimum on which an up-to-date supervisor should be informed. Objectives of the book are to provide material that will contribute toward the supervisor's progress in a threefold manner: (1) by furnishing accurate information on which to base sound judgments; (2) by improvement to the maximum of his attitudes toward industry in general, and his job of supervision in particular, through frank discussion of management problems; (3) by developing skill on the part of the supervisor in carrying out his job.

John M. Amiss is director of industrial education, Chrysler Corporation, and Traver C. Sutton is a teacher in the science department at Cass Technical High School in Detroit.

Printing for the Beginning Pupil. Loop. 226 Bradford St., Charleston 1, W. Va.: James W. Loop, 1944 (revised). Pp. xvi + 227. $1.50 (paper cover); $2.00 (cloth cover).

This book is written in narrative fashion with an instructor and his pupil discussing the main points of each assignment. Assignments given are the minimum requirements for the first-year course in printing, and the book is so organized that the pupil may have a clear concept of where he is in relation to the rest of the class throughout the semester. This revised edition contains approximately 50 percent more information and 26 more illustrations (163 illustrations altogether). Chapters have been added on platen presswork, stereotyping, mitering, offset, paper, and newspaper work. Selected references, index. Sewed to open flat.

James W. Loop is printing instructor in the Charleston, W. Va., High School.

Woodworking Projects for Industrial Arts Students. Baysinger, Schaal. New York: McGraw-Hill Book Co., 1945. Pp. ix + 151. $1.40.

After discussing why planning is necessary and how to go about planning a particular project, this book presents a group of projects of varying degrees of difficulty and touching on a variety of interests. No attempt has been made to include instruction on tool manipulation since it is felt that this can best be handled by demonstration. The projects are not organized according to degree of difficulty since interest is of primary importance and subsequent achievements depend on the intensity of student interest in the work.

Gerald Baysinger has had 22 years of teaching experience in the Detroit, Mich., public schools. Hartley H. Schaal, now a lieutenant in the U.S. Army Ordnance Division, formerly taught in Detroit.

Manual of Aircraft Layout. Faltus, Steinmetz. New York: John Wiley & Sons, Inc., 1944. Pp. 240. $3.00.

Intended to serve as a textbook, manual, and reference in factory and school, this book is liberally illustrated. Instruction is included on blueprint reading, laying out jobs, template development and uses, and such accessory topics as layout tools, machine and hand tools, and elements of necessary mathematics. All the charts and tables commonly required in the fabrication of aircraft parts are also provided. Arrangement of the manual and the system of numbering by chapters are designed to facilitate additions and revisions. Indexed.

Rudolph Faltus is senior aircraft instructor at Samuel Gompers Trades School, San Francisco, California.

PAMPHLETS:

Vocational-Technical Training for Industrial Occupations is a 306-page report of results of an investigation conducted by the U.S. Office of Education on the subject. The bulletin, after setting forth the objectives, procedures, and organization of the report, discusses trends affecting vocational-technical training, industry's need for such training, present programs and facilities, and planning programs for the future. Conclusions and recommendations are made. Bibliography and index included. Vocational Division Bulletin No. 228. Available for 40c from the Superintendent of Documents, Washington, D.C.

Improvement of Instruction in Trade and Industrial Education is a report of the trends, procedures, and suggestions in and for the improvement of instruction, through supervision of trade and industrial education, discussed in the conferences held in the North Atlantic, western, and southern regions during the spring of 1944. Write for Supplement No. 2, Misc. 3657, U.S. Office of Education, Trade and Industrial Education Service, Washington 25, D.C.

Transportation Training, Bulletin No. 2, is an informative booklet for transportation training officials. Sections of the book include the following topics: federal training agencies; transportation training on railroads, in automotive maintenance, on airlines, etc.; various problems; training helps; selection of workers; and regional representatives. Available from Personnel Training Section, Division of Transport Personnel, Office of Defense Transportation, Washington, D. C.

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Simple Machines is a one-reel 16 or 35mm sound film depicting the lever, the inclined plane, the wedge, the pulley, and the screw. Applications of these devices to modern complex machines are demonstrated, with animated drawings to clarify abstract mechanical principles. Available from Encyclopaedia Britannica Films, Inc., 1841 Broadway, New York 23, N. Y. *Please mention* SCHOOL SHOP.

Your Life Work films are a series of general guidance films covering such fields as radio and television, tool and die making, automotive service, electricity, drafting, machine shop, engineering, etc. For full details write, *mentioning* SCHOOL SHOP, to Vocational Guidance Films, Inc., 2708 Beaver Ave., Des Moines 10, Iowa.

Air Age Physics (Mechanics) is a series of 15 slidefilm subjects, comprising a total of 846 individual pictures, designed to help in establishing a visual and mathematical relationship between fundamental principles of physics and their application to the airplane. Write to the Jam Handy Organization, 2900 East Grand Blvd., Detroit 11, Michigan, *mentioning* SCHOOL SHOP.

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Machine Card *from page 9*

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Distribution *from page 24*

ually measured before placing the material into the end-wise cases. In the flat type of lead and slug case, the material can be arranged in order of size and placed where it "fits" without measurement of each size.

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Polytech *(from page 8)*

type of education which counseling has indicated to be most suitable for his needs.

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from Washington *from page 34*

waves them away with the wrist of their collective hand.

The EPC admits, of course, that men in the Army may learn certain skills. Some of these skills may even be useful when the soldier reenters civilian life.

When compared, however, with the vocational training possible in the public schools, the "incidentally learned military variety" is way below standards, the EPC believes. The Army too frequently has to teach large numbers of men occupations for which there is no large demands in civilian life. The Army, too, has to reach a specific occupational skill with the greatest speed; hence the danger of overspecialization. Finally, says the EPC, what the man in the Army wants to do and likes to do is necessarily subordinated to what the Army wants him to do.

Argues the Educational Policies Commission: "Given a fraction of the money which a year of military service would require, the schools and colleges could do a far better job of vocational guidance and training for peaceful civilian pursuits than could the Army."

As this is being written no one from the "other side" has yet answered that argument.

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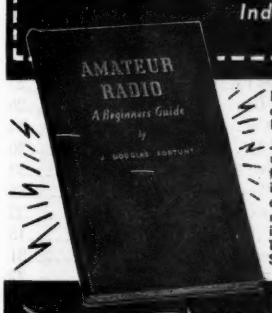

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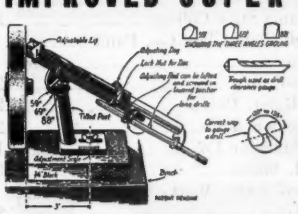

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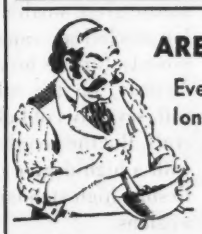

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from WASHINGTON by MICHAEL PACA

VOCATIONAL educators, who have long looked upon businessmen as friends of trade training *only*, might well lift a quizzical eyebrow on reading the U. S. Chamber of Commerce new study. That study is entitled *Education—An Investment in People.* It marshals much evidence to show that more and better education for the people means more and better business for businessmen. But what will strike vocational educators as unusual is the insistence of the Chamber of Commerce that this time —and for the first time—it has in mind not vocational training alone but general education as well.

● First, a look at the study itself. It consists of an imposing collection of charts, tables, and statistics which add up to one fact: the economic status and educational level of people rise and fall together.

The U. S. Chamber of Commerce reached this conclusion by looking at people living in all parts of the country, their schooling and their standards of living. Thus Chamber of Commerce statisticians found that people with more schooling earn more money. As proof it cites one sampling of adults earning $5000 or more. Of this group, more than half had been in college, 39 percent had attended high school, and only 11 percent of those who had 8 years of schooling or less reached the $5000-income bracket.

U. S. Chamber of Commerce officials also found that persons with higher education pay more rent for their dwellings or own more expensive homes—a fact which the Chamber calls politely to the attention of real-estate men. Further, the Chamber goes on to prove, people with more years of schooling buy more—or to put it more technically, areas of high educational levels are also areas of high per-capita cost. And this fact is of more than passing interest to retailers and manufacturers of consumer goods. To service industries, the U. S. Chamber of Commerce tells that people with more schooling predominate among subscribers to telephone service and magazines.

● The next steps in the businessmen's reasoning are these: commerce, industry, and agriculture can be expanded by widening and improving the education for all people. But better and wider education costs more money. Hence, businessmen, urges the Chamber of Commerce, may well afford to spend more money for schooling as an investment.

Some 30 years ago businessmen and manufacturers had made a recommendation to the people which had a similar ring. However, that recommendation, which had much to do with the approval of the Smith-Hughes act, was definitely restricted to trade training. Now in the good year of 1945, businessmen say:

"Technical education is not enough. Cultural education must accompany technical training to develop the appetites of the people for a better living that can come from the use of the products of American industry and agriculture."

● During the coming months businessmen and local chambers of commerce in your community may begin to "talk up" the facts gathered by their national chamber and to stress the value of general education. That, however, should be no cause for worry: businessmen are not losing their faith in vocational education. They are merely developing a little more faith in general education.

● As if to prove that it still believes very much in vocational training, the U. S. Chamber of Commerce asked Dr. Harold Clark of Columbia University to take a look at the tie-up between income and technical training in several countries other than the U. S. A. Dr. Clark found that natural resources—land, oil, forests, minerals—mean nothing to the economic standards of the people, unless these resources are transmuted into natural wealth by the magic touch of technical skill. Thus, Brazil has great nature-given wealth. But its people have low technical capacities. The result: poverty for the broad masses of people. Norway, on the other hand, has poor soil, severely cold climate, and few minerals. But the people have been equipped with a high degree of technical training. Result: high standard of living for Norwegians.

● The proponents and opponents of compulsory military training have not yet come to grips. Not one of the several military training bills is yet being pushed seriously in Congress. This is giving encouragement to those of organized education who oppose the measure. It is also giving them time to hammer away at the arguments against compulsory training.

Latest such argument, involving the question of vocational education, was proposed by the men and women who make up the Educational Policies Commission. As already reported in these columns, President Roosevelt and others seek a year of training not merely for the values of national security. They also claim that a year of training would give youth needed health, concepts of good citizenship, and vocational training. The Educational Policies Commission, examining these claims one by one,

(Continued on page 32)

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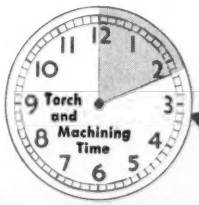

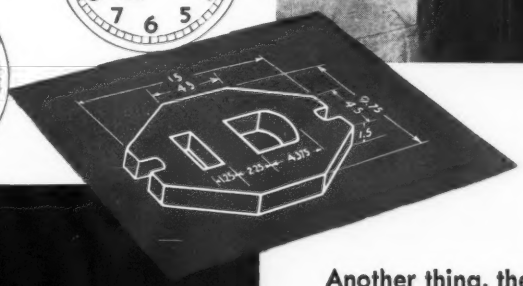

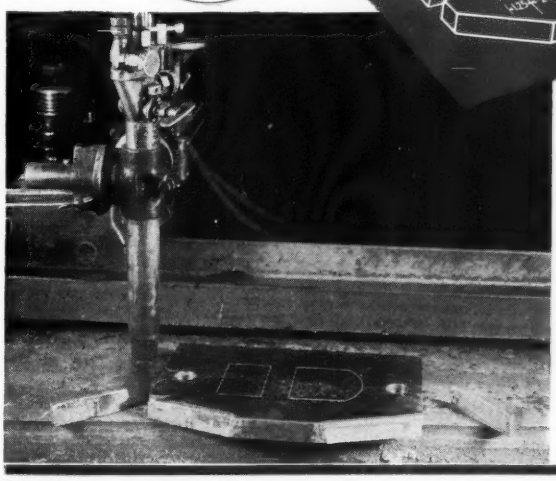

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